

## Chairman's Message

This past few months have seen some extraordinary feats at the limits of what scientific instruments can now achieve. On 13 July, the LHCb experiment at CERN announced the discovery of the pentaquark, a bound state of five quarks predicted by the Standard Model of particle physics, but only now detectable, thanks to the very much greater power of the Large Hadron Collider since its extended shutdown and upgrade. Just one day later, on 14 July, NASA's *New Horizons* space probe made its closest approach to Pluto after eleven-and-a-half years in free-fall. This little probe is so far away that it will take 16 months for all the data from its successful flyby of the dwarf planet to be sent back to Earth. After a similar eleven-and-a-half years in deep space, ESA's *Rosetta* space probe continues to orbit the comet 67P/Churyumov-Gerasimenko and beam back pictures to Earth as this comet travels ever closer to the Sun. In March 2015, another NASA space probe, *Dawn*, arrived in orbit around the dwarf planet Ceres, having already visited Vesta in 2011, and thus became the first space probe ever to successively orbit two different extraterrestrial bodies (Fig. 1). Wow!

The discoveries that these tools of science have provided and, with luck, will continue to provide us with are wholly and entirely dependent on the technology that they embody. No supercollider - no pentaquark.

No space probe - no close-up images of distant worlds. The popular history of science tends to focus on individuals as the drivers of scientific discovery, but it has not been so since before the Scientific Revolution in the seventeenth century. Ever since the telescope and the microscope, the chronometer and the sextant, were devised, it is not individuals who have given us advances in our understanding of the world, but advances in technology which have revealed the world to us more readily and in ever greater detail. Of course, human labour and ingenuity lie behind all advances in technology, but it is the inexorable refinement and development of the technologies of science which have brought us into ever closer contact with what it is that we seek to know. And that it what makes the study of the history of that technology, that is to say, the history of scientific instruments, both so significant and so fascinating. Happy reading!

Marcus Cavalier

Fig. 2 *Keeping the SIS afloat at Chatham Historic Dockyard: Practising rope-making in the Ropery - Meetings Secretary, Nigel Parkinson, holds the tension, whilst Executive Officer, Peter Thomas, assists.*  
Photo by Marcus Cavalier



Fig. 1 *'Dawn' mission patch.*  
Photo credit: NASA.



## Cover: Hero's Double Fountain

The participants of this year's study trip to Portugal saw many instruments, of which to the Editor's mind one of the most charming and whimsical ones is selected for this cover. Hero or Heron's Fountain is a hydraulic machine invented by the Greek mathematician and engineer Hero (or Heron) of Alexandria around the first century AD. His spectacular hydraulic devices became the darling of those scholars in the Renaissance inspired by 'Natural Magic' (the precursor of our physics) who regarded him as the greatest experimenter of antiquity although it is hard to know which pneumatic devices described in his *Pneumatica* were actually invented by him or by his predecessor Ctesibius, or by other anonymous inventors of the Alexandrine School. Our confection of burgundy coloured glass and fancy pipework is still in that eighteenth-century tradition of 'drawing room science' when it was important to attract wealthy patrons for the advancement of science. Those of us who have practiced school

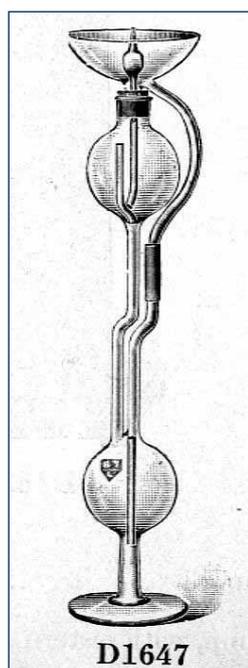


Fig. 3 *Hero's fountain in glass and rubber in the 1924 Baird & Tatlock catalogue.*

science in our youth will remember these splashy, eye-catching demonstrations but with apparatus much more utilitarian (Fig. 3).

The fountain can spout almost as high above the basin as the water falls from the upper into the lower glass bowl. As soon as the water level in the upper bowl has dropped so low that the water bearing tube no longer touches the water surface, the fountain stops. To make it play again the two glass bowls are turned around on its swivel joint, hence it is a 'double' fountain. The device's action seems to smack of perpetual

motion but a sharp-eyed observer will see that the height of the jet of water is constantly decreasing as the upper bowl empties. It is all a question of the interplay between pneumatic pressure and gravity. This photo was taken by Jean-François Loude.

A comprehensive report of the Portugal Visit will be published in the December issue.

WDH

## Bumper Year

Leaving through this year's *Bulletins* reinforces the view that this has been yet another bumper year for the SIS, with a very successful trip to Portugal and an enjoyable AGM weekend in Chatham (Fig. 2). In this issue, as in all others, we try to cater for the multivariable interests of our members, but in the end it is up to you, dear readers. What we publish is what *you* write. To reiterate our Chairman's message: 'Happy reading' and 'happy writing'!

WDH